

DOUBLE-BOTTOM TANK AND MIXING AUGER FOR CHOPPING
ANIMAL FEED

The present descriptive memory refers, as its
5 title indicates, to a double-bottom tank and mixing auger
for chopping animal feed, of the type that is transported
using a trailer or that is incorporated into a self-
propelled vehicle. Said tanks are used to chop and mix
animal fodder ingredients, preferably in agricultural
10 installations.

Currently, several types of tanks are used for
animal feed chopping. Animal feed usually includes
various types of forage, such as alfalfa, straw, vetch,
15 etc. as well as different varieties of cereal flour. The
animal feed is chopped inside the tank by one or more
interacting cutting screws made up of spirals that
converge towards the centre of the screw, where sometimes
there are several spiral blades that create a diameter
20 noticeably narrower than that of the spirals.

The tank itself is generally a V shaped
container with a rounded bottom, and usually the diameter
of the bottom is wider than the diameter of the circle
25 described by the spirals of the cutting roller when they
rotate.

Tanks currently used to chop animal feed have
the main disadvantage of accumulating the product in the
30 centre of the tank, i.e. between the external diameter of
the central blades and the rounded bottom of the tank,
which means the shafts of the chopping mechanisms, i.e.
the chopping spiral screws, have to generate quite a high

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operating torque, and sometimes this strain can even buckle them.

To solve this problem affecting current animal
5 feed chopping tanks, the double-bottom tank and mixing
auger for chopping animal feed that is the subject of the
present invention has been developed. Close to the centre
of the bottom there is an internal irregularly-shaped
insert, preferably quadrangular and of variable
10 thickness, depending on the actual requirements, which
bends to adapt itself to the rounded bottom of the tank,
in such a way that it rests partly on the bottom of the
tank and partly on either side. This rounded part creates
a double bottom. Naturally, the insertion of this part
15 between the bottom of the tank and the external diameter
created by the central chopping blades means that the
accumulation of product is minimized, precisely at the
most inconvenient point of the chopping screw, at its
centre. The mixing auger has been improved with two
20 blades disposed at 180°, of laminar section and variable
thickness, placed at the geometrical centre of the auger
shaft. These blades improve the mixing process of the
product whilst it is turned over, helping the mixture to
move forward and significantly reducing mixing times.

25

The invention being put forward brings one main
advantage over the systems currently used to chop animal
feed: as a consequence of the combined effect of the said
elements, the operating torque is significantly improved,
30 towards the centre of the tank and, at the same time,
overloads are prevented in that area, as there is no
unnecessary accumulation of product. Obviously, the
chopped product flows more easily, improving

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significantly the operating torque of the machine and increasing productivity.

To better understand the subject of the present invention, the preferred optimal assembly is represented in the annexed plan. In this plan:

Figure -1- shows a side section of the central part of the double-bottom tank for chopping animal feed, with a detailed view of the position of the insert and of the mixing auger.

Figure -2- shows the double-bottom tank for chopping animal feed in perspective, with a detailed top view of the bottom of the tank with its additional insert.

Figure -3- shows a front section view where we can see the blades.

The double-bottom tank and mixing auger for chopping animal feed being put forward comprises, as can be seen from the figures mentioned above, a frame (1) made of any of several materials and laminar walls that has an insert (3) installed close to the centre of its rounded bottom (2). This part creates a double bottom and two thirds of the part rest on either side of the tank.

The said insert (3) consists of an irregularly-shaped part, preferably quadrangular and of variable thickness that is not flat but curved and has a bevel edge (4) around its perimeter that starts at the base and

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ends at the top face. At the centre of the shaft of the mixing auger (5) there are two blades (6) disposed at 180°.

5 A detailed description of the rest of the features of this tank and the chopping roller is deliberately omitted, as they are not considered to be the subject of any claim.

10 Now that the nature of this invention and one way to manufacture it have been sufficiently described, it only remains to be said that this description is not restrictive, and it is possible to introduce slight changes, as long as they do not affect the
15 characteristics claimed hereunder.

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CLAIMS

1 - Double-bottom tank and mixing auger for chopping animal feed, of the type that is used in agricultural installations to prepare animal feed. These tanks have chopping devices comprising of one or more screws with spirals placed at the bottom of the tank that cut the forage and mix it with different cereal flour. The invention is characterized in that the rounded bottom -2- of the body -1- of the tank has an insert -3- placed close to its centre.

2 - Double-bottom tank and mixing auger for chopping animal feed, as described in the previous claim, characterized in that the insert -3- is inclined in such a way that two thirds of it rest against either side of the tank.

3 - Double-bottom tank and mixing auger for chopping animal feed, as described in the previous claims, characterized in that the irregularly-shaped insert -3-, preferably rectangular, is not flat but curved, of variable thickness and has a bevel edge -4- around its perimeter that starts at the base and ends at the top face.

4 - Double-bottom tank and mixing auger for chopping animal feed, as described in the previous claims, characterized in that the mixing auger -5- includes two blades disposed at 180° that have a laminar section and variable thickness, and are placed at the shaft's geometrical centre; the reduced diameter of these

blades improves the mixing process of the product whilst it is turned around, helping the mixture to move forward and significantly reducing mixing times.

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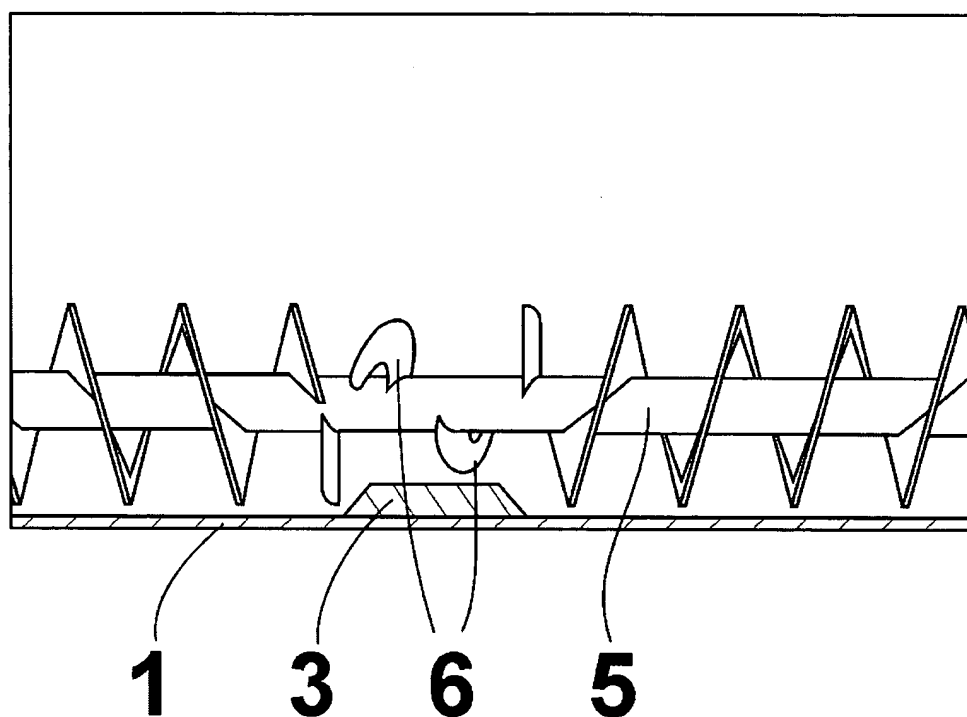
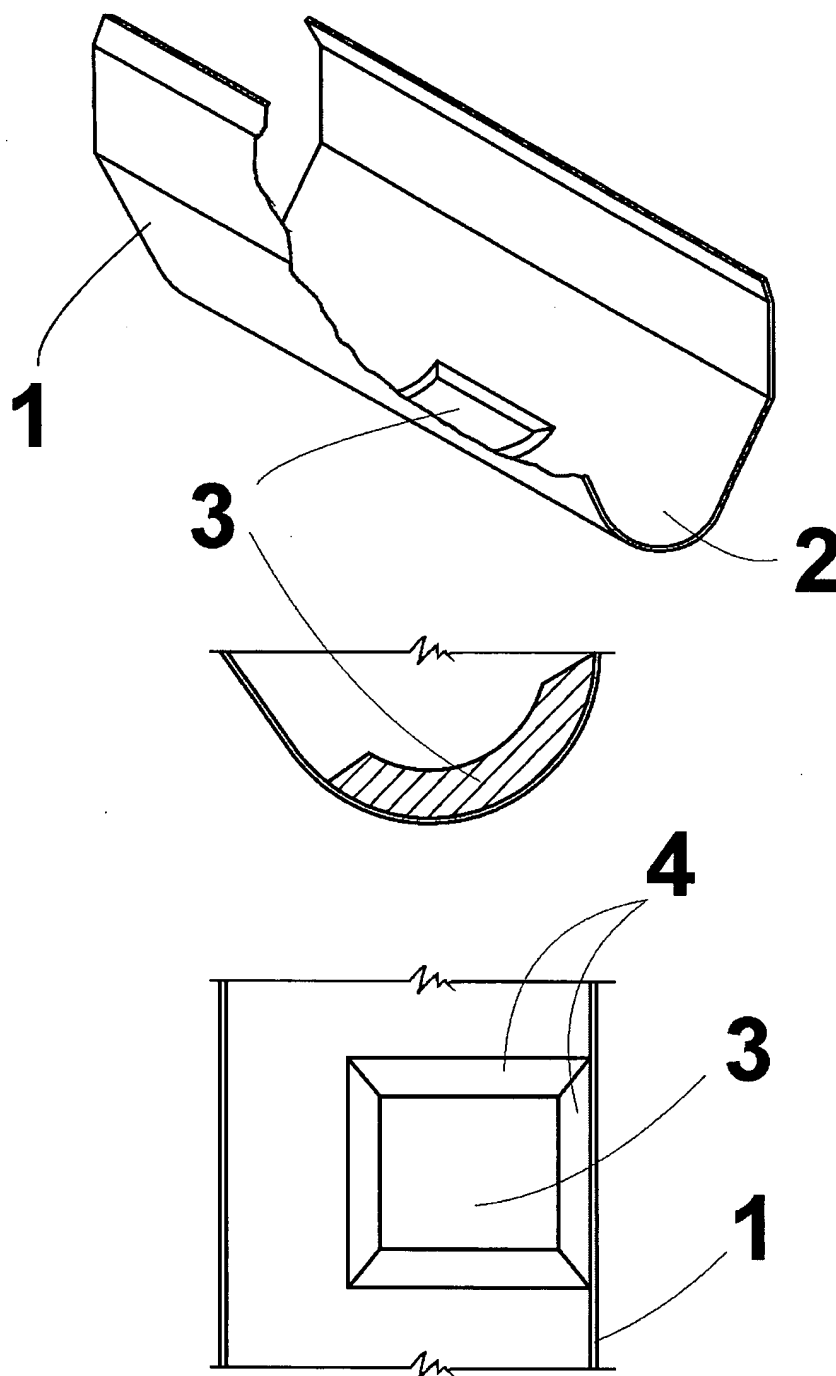
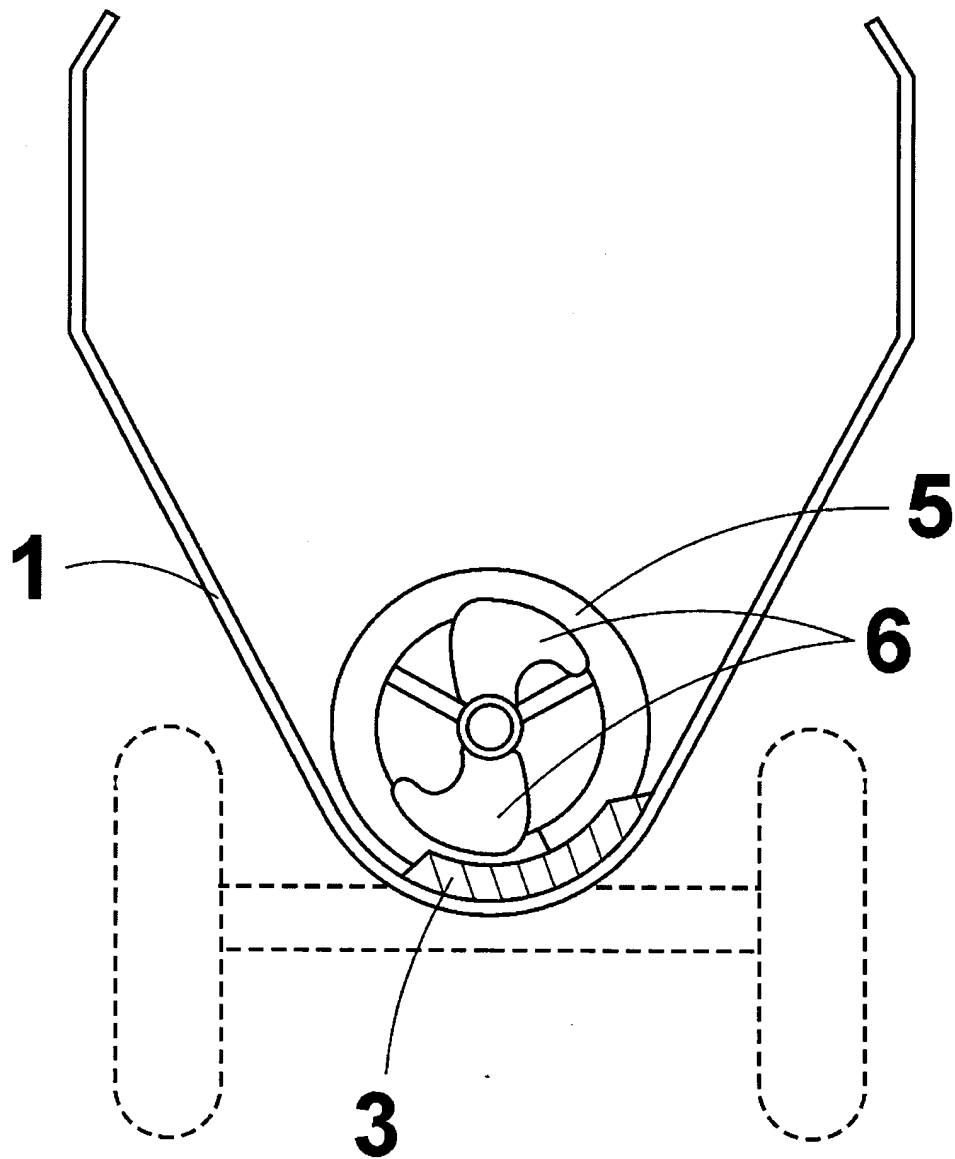


Fig.1

**Fig.2**

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**Fig.3**

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES03/00148

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01K5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷ A01K, B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ES 2068142 A (TALLERES TORRES MARTI S.L.) 01.04.95 the whole document	1,4
A	WO 98/57537 A (NORTHING -TON LIMITED) 23.12.98 abstract, figure 1	1
A	ES 2083817 A (SGARIBOLDI) 16.04.96 page 4 lines 2-32, figures 1-4	4
A	ES 2123419 A (TATOMA) 01.01.99 abstract, figures	4
A	EP 1042951 A (SGARIBOLDI) 11.10.2000 page 4 lines 21-24, page 5 lines 15-20, figures 7,8,9	1,4

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

09 June 2003 (09.06.03)

Date of mailing of the international search report

10 June 2003 (10.06.03)

Name and mailing address of the ISA/

SPTO

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
ES 2068142A	01.04.95	DE 9408205 U FR 2705206 AB	03.11.94 25.11.94
WO 9857537 A	23.12.98	IE 980469 A IE 980468 A AU 7928598 A ZA 9805240 A	16.12.98 16.12.98 04.01.99 25.03.99
ES 2083817 A	16.04.96	EP 562693 AB PL 298261 A MX 9301710 A IT 1255013 B AT 134829 T DE 69301669 D DE 69301669 T PL 170577 B	29.09.93 29.11.93 31.01.94 13.10.95 15.03.96 11.04.96 19.09.96 31.01.97
ES 2123419 A	01.01.99	NONE	NONE
EP 1042951A	11.10.00	ITMI 990718 A IT 1312054 B	09.10.00 04.04.02

INFORME DE BÚSQUEDA INTERNACIONAL

Solicitud internacional n°
PCT/ES03/00148

A. CLASIFICACIÓN DEL OBJETO DE LA SOLICITUD

CIP7 A01K5/00

De acuerdo con la Clasificación Internacional de Patentes (CIP) o según la clasificación nacional y la CIP.

B. SECTORES COMPRENDIDOS POR LA BÚSQUEDA

Documentación mínima consultada (sistema de clasificación, seguido de los símbolos de clasificación)

CIP7 A01K, B01F

Otra documentación consultada, además de la documentación mínima, en la medida en que tales documentos formen parte de los sectores comprendidos por la búsqueda

Bases de datos electrónicas consultadas durante la búsqueda internacional (nombre de la base de datos y, si es posible, términos de búsqueda utilizados)

CIBEPAT, EPODOC

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones n°
X	ES 2068142 A (TALLERES TORRES MARTI S.L.) 01.04.95 todo el documento	1,4
A	WO 98/57537 A (NORTHING -TON LIMITED) 23.12.98 resumen , figura 1	1
A	ES 2083817 A (SGARIBOLDI) 16.04.96 página 4 línea 2-32, figuras 1-4	4
A	ES 2123419 A (TATOMA) 01.01.99 resumen, figuras	4
A	EP 1042951 A (SGARIBOLDI) 11.10.2000 página 4 líneas 21-24, página 5 líneas 15-20, figuras 7,8,9	1,4

☐ En la continuación del recuadro C se relacionan otros documentos ☒ Los documentos de familia de patentes se indican en el anexo

* Categorías especiales de documentos citados:

"A" documento que define el estado general de la técnica no considerado como particularmente relevante.

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"&" documento que forma parte de la misma familia de patentes.

Fecha en que se ha concluido efectivamente la búsqueda internacional. 09.06.2003 (9 Junio 2003)

Fecha de expedición del informe de búsqueda internacional

10 JUN 2003 10.06.03

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INFORME DE BÚSQUEDA INTERNACIONAL
 Información relativa a miembros de familias de patentes

Solicitud internacional n°
 PCT/ES03/00148

Documento de patente citado en el informe de búsqueda	Fecha de publicación	Miembro(s) de la familia de patentes	Fecha de publicación
ES 2068142A	01.04.95	DE 9408205 U FR 2705206 AB	03.11.94 25.11.94
WO 9857537 A	23.12.98	IE 980469 A IE 980468 A AU 7928598 A ZA 9805240 A	16.12.98 16.12.98 04.01.99 25.03.99
ES 2083817 A	16.04.96	EP 562693 AB PL 298261 A MX 9301710 A IT 1255013 B AT 134829 T DE 69301669 D DE 69301669 T PL 170577 B	29.09.93 29.11.93 31.01.94 13.10.95 15.03.96 11.04.96 19.09.96 31.01.97
ES 2123419 A	01.01.99	NINGUNO	NINGUNO
EP 1042951A	11.10.00	ITMI 990718 A IT 1312054 B	09.10.00 04.04.02

(12) SOLICITUD INTERNACIONAL PUBLICADA EN VIRTUD DEL TRATADO DE COOPERACIÓN
EN MATERIA DE PATENTES (PCT)

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(43) Fecha de publicación internacional
9 de Octubre de 2003 (09.10.2003)

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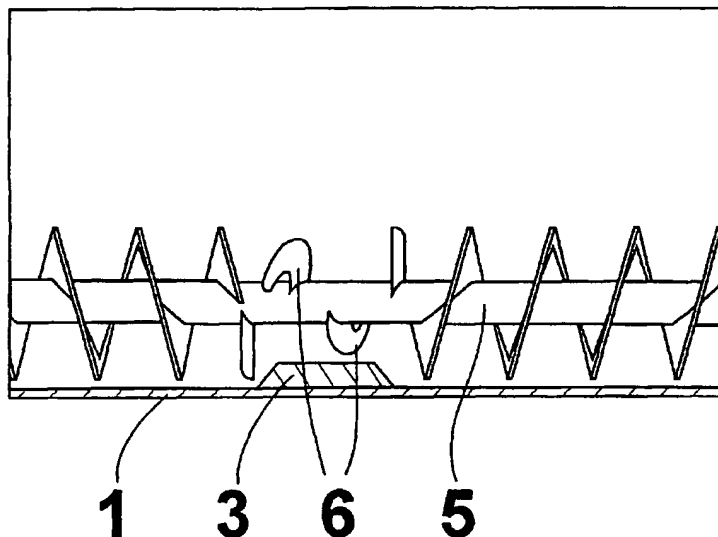
(10) Número de Publicación Internacional
WO 03/081994 A1

- (51) Clasificación Internacional de Patentes⁷: **A01K 5/00** (72) Inventor; e
(75) Inventor/Solicitante (*para US solamente*): **TORRES ASO, Fernando** [ES/ES]; Polígono Industrial Las Paules 53-55, E-22400 Monzón (Huesca) (ES).
(21) Número de la solicitud internacional: PCT/ES03/00148
(22) Fecha de presentación internacional:
1 de Abril de 2003 (01.04.2003) (74) Mandatario: **AZAGRA SAEZ, Pilar**; Las Damas, 17, Pral. Centro, E-50008 Zaragoza (ES).
(25) Idioma de presentación: español (81) Estados designados (*nacional*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
(26) Idioma de publicación: español (84) Estados designados (*regional*): patente ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), patente
(30) Datos relativos a la prioridad:
P200200750 1 de Abril de 2002 (01.04.2002) ES
(71) Solicitante (*para todos los Estados designados salvo US*):
GRUPO TATOMA, S.L. [ES/ES]; Polígono Industrial Las Paules 53-55, E-22400 Monzón (ES).

[Continúa en la página siguiente]

(54) Title: DOUBLE BOTTOM TANK AND MIXING AUGER FOR CHOPPING ANIMAL FEED

(54) Título: CUBA CON DOBLE FONDO Y SINFIN MEZCLADOR PARA EL PICADO DE PIENSOS



(57) Abstract: The invention relates to a double-bottom tank (1) and a mixing auger (5) for chopping animal feed, of the type which are transported using a trailer or which are incorporated into a self-propelled vehicle. Said tanks are used to chop and mix animal fodder ingredients, preferably in agricultural installations. The inventive tank is characterised in that it comprises an irregularly-shaped insert (3), close to the centre of the tank (1), and in that the two blades (6) are disposed at 180° at the centre of the mixing auger (5), thereby affording the advantage of improving the operating torque and preventing any unnecessary accumulation of the product.

[Continúa en la página siguiente]

WO 03/081994 A1



euroasiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
patente europea (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR), patente OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*Para códigos de dos letras y otras abreviaturas, véase la sección
"Guidance Notes on Codes and Abbreviations" que aparece al
principio de cada número regular de la Gaceta del PCT.*

Publicada:

— con informe de búsqueda internacional

(57) Resumen: Cuba (1) de doble fondo y sinfín (5) mezclador para el picado de piensos del tipo de las que son transportadas por un remolque, o bien incorporadas en un vehículo autopropulsado, siendo empleadas dichas cubas para picar y mezclar los componentes que intervienen en el pienso de los animales, preferentemente en las instalaciones agropecuarias, caracterizada por incorporar un suplemento (3) de forma irregular, hacia el centro de la cuba (1), y por la disposición de dos palas (6) a 180° en el centro del sinfín (5) mezclador, proporcionando la ventaja de mejorar el par de trabajo y evitar la acumulación innecesaria del producto.